Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (original): A method of diagnosing pathologic heart conditions comprising:

identifying a systolic sub-interval of a systolic interval for a plurality of heart cycles in a sequence of heart cycles;

computing an energy value for each systolic sub-interval;

computing a composite energy value using the computed energy values for each systolic sub-interval; and

comparing the composite energy value to a threshold level in order to distinguish between a normal heart and a pathologic heart.

2. (original): A method of diagnosing pathologic heart conditions comprising:

filtering a time series of heart sounds;

parsing the time series of heart sounds into a sequence of individual heart cycles;

identifying a systolic interval for each heart cycle;

identifying a systolic sub-interval of the systolic interval for each heart cycle;

computing an energy value for the systolic sub-interval of one or more heart cycles, said energy value being proportional to the energy level associated with the filtered series of heart sounds;

computing a composite energy value for the systolic sub-intervals of one or more heart cycles; and

comparing the composite energy value to a threshold level in order to distinguish between a normal heart and a pathologic heart.

3. (original): The method of claim 2 wherein said parsing step uses electro-cardiogram (ECG) data in order to transform a time series of heart sounds into a sequence of individual heart cycles.

4. (original): The method of claim 2 wherein said parsing step uses acoustic heart sounds obtained directly from a patient in order to transform a time series of heart sounds into a sequence of individual heart cycles.

5. (original): The method of claim 2 wherein identifying a systolic interval for each heart cycle is achieved by identifying pulses on an electro-cardiogram (ECG).

6. (original): The method of claim 2 wherein identifying a systolic interval for each heart cycle is achieved by acoustically locating a first and a second heart sound using a bandpass filter, said bandpass filter applied to the time series of heart sounds.

7. (original): The method of claim 2 wherein filtering the time series of heart sounds is achieved using a bandpass filter.

8. (original): The method of claim 2 wherein filtering the time series of heart sounds is achieved using time-frequency transforms.

9. (original): The method of claim 8 wherein the time-frequency transform is a wavelet transform.

10. (original): The method of claim 8 wherein the time-frequency transform is a Fourier transform.

11. (original): The method of claim 2 wherein the systolic sub-interval is centered in systole.

12. (original): The method of claim 2 wherein the systolic sub-interval is centered in systole and is half of the systolic interval.

13. (original): The method of claim 2 wherein the composite energy value is computed as the median of the computed energy values for more than one of the systolic sub-intervals of the heart cycles.

14. (original): The method of claim 2 wherein the composite energy value is computed as the weighted average of more than one of the computed energy values for the systolic sub-intervals of the heart cycles.

15. (original): The method of claim 2 wherein the composite energy value is computed as the median across more than one of the heart cycle systolic sub-intervals of a quantity proportional to energy.

16. (original): The method of claim 2 wherein the composite energy value is computed as the weighted average energy value across more than one of the heart cycle systolic sub-intervals.

17. (original): The method of claim 14 wherein the ratio of energies between systolic interval and diastolic interval are also used to distinguish a normal heart from a pathologic heart by prior statistical characterization of the ratio of energies between systolic interval and diastolic interval for normal and pathologic hearts.

18. (original): The method of claim 14 wherein the standard deviation of the energy in a systolic interval is also used to distinguish a normal heart from a pathologic heart by prior statistical characterization of the standard deviation of the energy in a systolic interval for normal and pathologic hearts.

19. canceled

20. (currently amended): <u>A system for diagnosing pathologic heart conditions comprising:</u>
<u>a portable computing device for:</u>

managing data collection from new patients;

storing data; and

analyzing data,

and

a patient data collection unit for acquiring electro-cardiogram (ECG) and heart sound data from a patient, said patient data collection unit operatively connected with said portable computing device, wherein the patient data collection unit comprises:

a contact microphone for obtaining acoustic data;

an acoustic pre-amplifier operatively connected with said contact microphone, said pre-amplifier having a passband of 20 Hz to 2 kHz used to condition acoustic data received from said contact microphone;

a variable amplifier operatively connected with said acoustic pre-amplifier for variably amplifying the conditioned acoustic data;

an electro-cardiogram (ECG) electrode;

an ECG amplifier operatively connected with said electro-cardiogram (ECG) electrode;

an analog to digital converter operatively connected with said variable amplifier and said ECG amplifier, said analog to digital converter for digitizing acoustic data and electro-cardiogram (ECG) data.

21. (original): A method of optimizing a heart auscultation screening algorithm comprising:

applying a heart auscultation screening time-frequency transform algorithm to a set of data, wherein:

said algorithm includes wavelets and bandpass filters;

said data includes heart sounds known to be normal and heart sounds known to be pathologic;

said heart sounds being characterized by a systolic interval;

said systolic interval capable of being divided into systolic sub-intervals,

recording the results of said heart auscultation screening algorithm for a variety of time-frequency transform parameters and systolic sub-intervals; and

determining an optimal combination of wavelet scale parameter and systolic sub-interval for use with said heart auscultation screening wavelet algorithm based on sensitivity and specificity measurements.

22. (original): A computer readable medium whose contents cause a computer based system to determine patient heart pathology by:

identifying a systolic sub-interval of a systolic interval for a plurality of heart cycles in a sequence of heart cycles;

computing an energy value for each systolic sub-interval;

computing a composite energy value using the computed energy values for each systolic sub-interval; and

comparing the composite energy value to a threshold level in order to distinguish between a normal heart and a pathologic heart.

23. (original): A computer readable medium whose contents cause a computer based system to determine patient heart pathology by:

filtering a time series of heart sounds;

parsing the time series of heart sounds into a sequence of individual heart cycles;

identifying a systolic interval for each heart cycle;

identifying a systolic sub-interval of the systolic interval for each heart cycle;

computing an energy value for the systolic sub-interval of one or more heart cycles, said energy value being proportional to the energy level associated with the filtered series of heart sounds;

computing a composite energy value for the systolic sub-intervals of one or more heart cycles; and

comparing the composite energy value to a threshold level in order to distinguish between a normal heart and a pathologic heart.

24. (currently amended): A computer readable medium whose contents transform a computer based system into a heart pathology detection system, comprising:

a patient data collection subsystem for acquiring electro-cardiogram (ECG) and heart sound data from a patient;

a data management subsystem for managing electro-cardiogram (ECG) and heart sound data;

a data analysis subsystem for processing and analyzing electro-cardiogram (ECG) and heart sound data comprising:

means for identifying a systolic sub-interval of a systolic interval for a plurality of heart cycles in a sequence of heart cycles;

means for computing an energy value for each systolic sub-interval;

means for computing a composite energy value using the computed energy values for each systolic sub-interval; and

means for comparing the composite energy value to a threshold level in order to distinguish between a normal heart and a pathologic heart; and

a data storage subsystem for storing processed electro-cardiogram (ECG) and heart sound data.